We claim

1. A color conversion table generating method wherein a plurality of patches outputted from a printing device are subjected to color measuring and a color conversion table which defines the correspondence between the color component values of various colors used in another image device and ink value data corresponding to the ink quantities of inks in individual ink colors used in the printing device is generated based on the result of the color measuring, the method comprising:

a step for extracting a smaller number of reference values than the total number of gradations in said ink value data with respect to each ink color and combining them thereby to create patch data which specifies a plurality of said patches;

a step for performing half tone processing where the patch data is inputted and transformed into half tone image data which indicates the presence or absence of ink dots to print a plurality of said patches; and

a step for generating said color conversion table based on color measuring data obtained by subjecting a plurality of the printed patches to color measuring,
wherein

the colors in said patch data are colors obtained by extracting a smaller number of reference values before correction than the total number of gradations in predetermined gradation values before correction from the gradation values before correction with respect to each ink color and combining the reference values before correction, carrying out correction for

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interpolation accuracy enhancement to increase the reference values before correction, and thereby bringing the magnitude of values after the correction and the ink quantity into substantially linear correspondence with each other; wherein

said ink value data is defined so that a gradation value which is an integral value existing in a predetermined range of value and corresponds to a higher-lightness range will be reduced in the ink recording rate corresponding to the unit variation in that gradation value as compared with gradation values corresponding to a lower-lightness range; and wherein

in said half tone processing, ink quantities corresponding to the reference values in said patch data are interpreted according to the definition of the gradation values to generate said half tone image data.

2. The color conversion table generating method according to Claim 1, wherein said ink value data is defined by allocating the total number of gradations to part of the range of value of ink recording rate.

3. A color conversion table generating method for generating a color conversion table which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, the method comprising:

a step for extracting gradation values where the ink quantity and the magnitude of the gradation values are in substantially linear correspondence with each other with respect to each ink color and combining them to create first gradation value data;

a step for subjecting the first gradation value data to correction for resolution enhancement with a higher rate of increase applied to a gradation value corresponding to a high-lightness range than to gradation values corresponding to a lower-lightness range to obtain said ink value data;

a step for performing half tone processing, taking into account deviations equivalent to fractional portions obtained when the ink value data is subjected to correction inverse to said correction for resolution enhancement to perform print operation; and

a step for generating a color conversion table where said ink value data and the color component values of various colors used in said another image device are in correspondence with each other based on color measuring data obtained by subjecting the result of the print operation to color measuring; wherein,

said first gradation value data is extracted beforehand so that colors in the low-lightness range will be larger in number than colors in the high-lightness range so as to compensate the resolution which is relatively degraded in the low-lightness range by said correction for resolution enhancement by interpolation accuracy.

4. The color conversion table generating method according to Claim 3, wherein the gradation values in said first gradation value data are created based on data obtained by transforming coordinates in a predetermined color space constituted of a smaller number of color components than the number of ink colors into gradation values which indicate the quantities of individual color inks by a predetermined transformation expression.

5. The color conversion table generating method according to Claim 3, wherein the gradation values in said first gradation value data are obtained by subjecting gradation values where the ink quantity and the magnitude of gradation values are in substantially linear correspondence with each other to γ correction where a smaller gradation value is corrected with a higher rate of increase as compared with larger gradation values and the result of the correction is outputted.

6. The color conversion table generating method according to Claim 3, wherein a gradation value which indicates the lowest lightness in said first gradation value data is equivalent to the highest ink recording rate at which the ink can be recorded on a printing medium; and in said correction for resolution enhancement, a predetermined gradation value range containing the gradation value which indicates the lowest lightness is excluded and the correction is carried out so that the remaining gradation value range will be matched with the whole gradation value range of said ink value data.

7. A print controller which refers to a color conversion table which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, and creates print data which indicates output images on the printing device from image data which indicates display images on the image device and causes print operation to be performed, the controller comprises:

an image data acquiring unit for acquiring image data where the color at each pixel in a matrix pattern is rendered with gradations with respect to images on said another image device;

a color converting unit which extracts gradation values where the ink quantity and the magnitude of gradation values are in substantially linear correspondence with each other with respect to each ink color and combines the gradation values to create first gradation value data, subjects the first gradation value data to correction for resolution enhancement with a higher rate of increase applied to a gradation value corresponding to a higher-lightness range than to gradation values corresponding to a lower-lightness range to obtain said ink value data, subjects the ink value data to half tone processing, taking into account deviations equivalent to fractional portions obtained when correction inverse to said correction for resolution enhancement is carried out, and performs print operation, generates a color conversion table where said ink value data and the color component values of various colors used in said another image device are in correspondence with each other based on color measuring data obtained by subjecting the result of the print operation to color

measuring, said first gradation value data being extracted beforehand so that colors in the low-lightness range will be larger in number than colors in the high-lightness range so as to compensate the resolution which is relatively degraded in the low-lightness range by said correction for resolution enhancement by interpolation accuracy, and refers to the thus generated color conversion table to color-convert said image data into corresponding ink value data;

a half tone processing unit for interpreting ink quantities indicated by the ink value data from the color-converted ink value data and transforming the ink quantities into pseudo half tone data where gradations are represented by the recording density of ink droplets recorded on a printing medium;

a print data creating unit which creates print data for driving and causing the printing device to discharge ink droplets according to the recording density specified by said pseudo half tone data with respect to each pixel; and

a print data outputting unit for outputting the print data to the printing device.

8. A color conversion table generator which generates a color conversion table which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, the generator comprise:

a first gradation value data acquiring unit for acquiring first gradation value data obtained by extracting gradation

values where the ink quantity and the magnitude of gradation values are in substantially linear correspondence with each other with respect to each ink color and combining the gradation values;

an ink value data acquiring unit for subjecting the first gradation value data to correction for resolution enhancement with a higher rate of increase applied to a gradation value corresponding to a higher-lightness range than to gradation values corresponding to a lower-lightness range to acquire the result of the correction as said ink value data;

a print operation performing unit for performing half tone processing, taking into account deviations equivalent to fractional portions obtained when the ink value data is subjected to correction inverse to said correction for resolution enhancement to perform print operation;

a print result color measuring unit for subjecting the result of the print operation to color measuring; and

a color conversion table generating unit for generating a color conversion table where said ink value data and the color component values of various colors used in said another image device are in correspondence with each other based on color measuring data obtained by subjecting the result of the print operation to color measuring,
wherein

said first gradation value data is extracted beforehand so that colors in the low-lightness range will be larger in number than colors in the high-lightness range so as to compensate the resolution which is relatively degraded in the low-lightness range by said correction for resolution enhancement by

interpolation accuracy.

9. A medium with a color conversion table generating program recorded thereon for generating a color conversion table which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, wherein the program causes a computer to carry out:

a first gradation value data acquiring function of acquiring first gradation value data obtained by extracting gradation values where the ink quantity and the magnitude of the gradation values are in substantially linear correspondence with each other with respect to each ink color and combining the gradation values;

an ink value data acquiring function of subjecting the first gradation value data to correction for resolution enhancement with a higher rate of increase applied to a gradation value corresponding to a higher-lightness range than to gradation values corresponding to a lower-lightness range and acquiring the result of the correction as said ink value data;

a print operation performing function of performing half tone processing, taking into account deviations equivalent to fractional portions obtained when the ink value data is subjected to correction inverse to said correction for resolution enhancement, and performing print operation;

a print result color measuring function of subjecting the result of the print operation to color measuring; and

a color conversion table generating function of generating a color conversion table where said ink value data and the color component values of various colors used in said another image device are correspondence with each other based on color measuring data obtained by subjecting the result of the print operation to color measuring; wherein

said first gradation value data is extracted beforehand so that colors in the low-lightness range will be larger in number than colors in the high-lightness range so as to compensate the resolution which is relatively degraded in the low-lightness range by said correction for resolution enhancement by interpolation accuracy.

10. A correspondence definition data creating method for creating correspondence definition data which defines the correspondence between ink color-by-ink color input gradation values to be inputted to a half tone processing module and the color component values of various colors used in another image device, the method comprising:

a step for creating said correspondence definition data by taking integral values existing in a predetermined range of value as said input gradation values; defining the input gradation values so that an input gradation value corresponding to a higher-lightness range will be reduced in variation in the ink recording rate corresponding to the unit variation in that input gradation value as compared with input gradation values corresponding to a lower-lightness range; and bringing colors indicated by combinations of input gradation values and colors

indicated by combinations of said color component values into correspondence with each other with respect to each ink color.

11. A correspondence definition data creating method wherein a plurality of patches outputted from a printing device are subjected to color measuring, and correspondence definition data which defines the correspondence between the color component values of various colors used in another image device and gradation values corresponding to the ink quantities of inks in individual colors used in the printing device is created based on the result of the color measuring, the method comprising:

a step for extracting a smaller number of reference values than the total number of gradations in gradation values corresponding to said ink quantities with respected to each ink color and combining them thereby to create patch data which specifies a plurality of said patches;

a step for performing half tone processing where the patch data is inputted and transformed into half tone image data which indicates the presence or absence of ink dots to print a plurality of said patches; and

a step for creating said correspondence definition data based on color measuring data obtained by subjecting a plurality of the printed patches to color measuring,
wherein

gradation values corresponding to said ink quantities are so defined that a gradation value which is an integral value existing in a predetermined range of value and corresponds to a higher-lightness range will be reduced in the ink recording

rate corresponding to the unit variation in that gradation value as compared with gradation values corresponding to a lower-lightness range;
and wherein

in said half tone processing, ink quantities corresponding to reference values in said patch data are interpreted according to the definition of the gradation values to generate said half tone image data.

12. The correspondence definition data creating method according to Claim 11, wherein said gradation values corresponding to ink quantities are defined by allocating the total number of gradations to part of the range of value of ink recording rate.

13. A correspondence definition data creating method for creating correspondence definition data which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, the method comprising:

a step for converting colors rendered by combinations of CMY colors to acquire first gradation value data where the magnitude of gradation values and the ink quantity are in substantially linear correspondence with each other;

a step for subjecting the first gradation value data to γ correction with a higher rate of increase applied to a smaller gradation value to create ink value data where the resolution in the high-lightness range is relatively enhanced;

a step for subjecting the result of print operation performed with said printing device based on the ink value data to color measuring; and

a step for creating correspondence definition data which defines the correspondence between said ink value data and the color component values of various colors used in said another image device from the result of the color measuring.

14. A correspondence definition data creating method for creating correspondence definition data which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, the method comprising:

a step for performing print operation with a plurality of pieces of ink value data which specify said ink quantities of inks in individual colors, obtained by subjecting first gradation value data where the ink quantity and the magnitude of gradation values are in substantially linear correspondence with each other to correction with a higher rate of increase applied to a gradation value corresponding to a higher-lightness range than to gradation values corresponding to a lower-lightness range; and

a step for creating correspondence definition data where said ink value data and the color component values of various colors used in said another image device are in correspondence with each other based on color measuring data obtained by subjecting the result of the print operation to color measuring.

15. The correspondence definition data creating method according to Claim 14, wherein said ink value data is data obtained by correcting said first gradation value data which indicates color components in a predetermined first color space by a predetermined transformation expression; and when said print operation is performed, half tone processing is performed, taking into account deviations equivalent to fractional portions obtained when correction inverse to the above correction is carried out.

16. The correspondence definition data creating method according to Claim 14, wherein said correction is γ correction where a smaller input value is corrected with a higher rate of change and the result of the correction is outputted.

17. The correspondence definition data creating method according to Claim 14, wherein a gradation value which indicates the lowest lightness in said first gradation value data is equivalent to the highest ink recording rate at which the ink can be recorded on a printing medium; and in said correction, a predetermined gradation value range containing the gradation value which indicates the lowest lightness is excluded and the correction is carried out so that the remaining gradation value range will be matched with the whole gradation value range of said ink value data.

18. A print controller which refers to a correspondence

definition data which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, and creates print data which indicates output images on the printing device from image data which indicates display images on the image device and causes print operation to be performed, the controller comprising:

an image data acquiring unit for acquiring image data where the color at each pixel in a matrix pattern is rendered with gradations with respect to images on said another image device;

a color converting unit which performs print operation with a plurality of pieces of ink value data which specify said ink quantities of inks in individual colors, obtained by correcting first gradation value data where the ink quantity and the magnitude of gradation values are in substantially linear correspondence with each other with a higher rate of increase applied to a gradation value corresponding to a higher-lightness range than to gradation values corresponding to a lower-lightness range; refers to correspondence definition data where said ink value data and the color component values of various colors used in said another image device are in correspondence with each other, based on color measuring data obtained by subjecting the result of the print operation to color measuring; and color-converts said image data into corresponding ink value data;

a half tone processing unit which interprets ink quantities indicated by the ink value data from the color-converted ink value data and transforms the ink quantities into pseudo half

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tone data where gradations are represented by the recording density of ink droplets recorded on a printing medium;

a print data creating unit which creates print data for driving and causing the printing device to discharge ink droplets according to the recording density specified by said pseudo half tone data; and

a print data outputting unit which outputs the print data to the printing device.

19. A correspondence definition data creating apparatus for creating correspondence definition data which defines the correspondence between ink value data which specifies the ink quantities of inks in individual color used in a printing device and the color component values of various colors used in another image device, the apparatus comprising:

a color separation unit which transforms colors rendered by combinations of CMY colors into first gradation value data where the magnitude of gradation values and the ink quantity are in substantially linear correspondence with each other;

an ink value data creating unit which subjects the first gradation value data to γ correction with a higher rate of increase applied to a smaller gradation value to create ink value data where the relative resolution in the high-lightness range is enhanced;

a print operation performing unit which creates print data which specifies ink quantities according to the ink value data and performs print operation with said printing device;

a print result color measuring unit which subjects the

result of the print operation to color measuring; and

a correspondence definition data creating unit which creates correspondence definition data which defines the correspondence between said ink value data and the color component values of various colors used in said another image device from the result of the color measuring.

20. A correspondence definition data creating apparatus for creating correspondence definition data which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, the comprising:

an ink value data acquiring unit which acquires a plurality of pieces of ink value data which specify said ink quantities of inks in individual colors obtained by correcting first gradation value data where the ink quantity and the magnitude of gradation values are in substantially linear correspondence with each other with a higher rate of increase applied to a gradation value corresponding to a higher-lightness range than to gradation values corresponding to a lower-lightness range;

a print operation performing unit which performs print operation with ink quantities specified by the ink value data;

a color measuring data acquiring unit which subjects the result of the print operation to color measuring to acquire color measuring data; and

a correspondence definition data creating unit which brings said ink value data and the color component values of

various colors used in said another image device into correspondence with each other based on the color measuring data to create correspondence definition data.

21. A medium with a correspondence definition data recorded thereon for creating correspondence definition data which defines the correspondence between ink value data which specifies the ink quantities of inks in individual colors used in a printing device and the color component values of various colors used in another image device, the program causes a computer to carry out:

a color separation function of transforming colors rendered by combinations of CMY colors into first gradation value data where the magnitude of gradation values and the ink quantity are in substantially linear correspondence with each other;

an ink value data creating function of subjecting the first gradation value data to γ correction with a higher rate of increase applied to a smaller gradation value to create ink value data where the relative resolution in the high-lightness range is enhanced;

a print operation performing function of creating print data which specifies ink quantities according to the ink value data and performing print operation with said printing device;

a print result color measuring function of subjecting the result of the print operation to color measuring; and

a correspondence definition data creating function of creating correspondence definition data which defines the correspondence between said ink value data and the color

component values of various colors used in said another image
device from the result of the color measuring.

22. A medium with a correspondence definition data creating
program recorded thereon for creating correspondence definition
data which defines the correspondence between ink value data
which specifies the ink quantities of inks in individual colors
used in a printing device and the color component values of various
colors used in another image device, the program causes a computer
to carry out:

an ink value data acquiring function of acquiring a
plurality of pieces of ink value data which specify said ink
quantities of inks in individual colors obtained by correcting
first gradation value data where the ink quantity and the
magnitude of gradation values are in substantially linear
correspondence with each other with a higher rate of increase
applied to a gradation value corresponding to a higher-lightness
range than to gradation values corresponding to a lower-lightness
range;

a print operation performing function of performing print
operation with ink quantities specified by the ink value data;

a color measuring data acquiring function of subjecting
the result of the print operation to color measuring to acquire
color measuring data; and

a correspondence definition data creating function of
bringing said ink value data and the color component values of
various colors used in said another image device in
correspondence with each other based on the color measuring data

to create correspondence definition data.